



**>>Entry Name: Zinc phosphate (Zn<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>)**

**Synonym(s):** Zinc phosphate (3:2), 9Cl, 8Cl. Zinc orthophosphate

**CAS Registry Number:** 7779-90-0

**Extra CAS Registry Numbers(s):** 13847-22-8

Zn<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>

**Molecular Formula:** O<sub>8</sub>P<sub>2</sub>Zn<sub>3</sub>

**Molecular Weight:** 386.113

**Accurate Mass:** 381.694279

**Percentage Composition:** O 33.15%; P 16.04%; Zn 50.81%

**Use/Importance:** Important in dental cements, metal coatings, corrosion inhibitors, pigments

**Solubility:** V. sl. sol. H<sub>2</sub>O. Easily sol. dil. aq. HCl

**>>Derivative:** Monohydrate

**CAS Registry Number:** 27176-06-3

**Source/Synthesis:** Manuf. from tetrahydrate at 250°

**>>Derivative:** Dihydrate

**CAS Registry Number:** 14485-28-0

**Source/Synthesis:** Possibly formed by dehydration of the tetrahydrate at *ca.* 110-150°. Monoclinic

**>>Derivative:** Tetrahydrate

**CAS Registry Number:** 7543-51-3

**Source/Synthesis:** Synth. from ZnSO<sub>4</sub> aq. + (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub> or K<sub>2</sub>HPO<sub>4</sub> aq. at r.t.; or ZnO + H<sub>3</sub>PO<sub>4</sub> aq.

**Physical Description:** Colourless plates with weak birefringence

**Other Data:** Loses 2H<sub>2</sub>O at 150°, 1H<sub>2</sub>O at 200°. The fourth H<sub>2</sub>O is stable at up to 250°. Also reported to lose 4H<sub>2</sub>O at 105-175° → anhydrous α-salt

**>>Variant:** α-form

**Molecular Formula:** O<sub>8</sub>P<sub>2</sub>Zn<sub>3</sub>

**Molecular Weight:** 386.113

**Accurate Mass:** 381.694279

**Percentage Composition:** O 33.15%; P 16.04%; Zn 50.81%

sharing tetrahedra, Zn-O 186-203 pm

**Other Data:** Stable at <962° when converts into β-form. Unstable in presence of impurity ions eg. Mn<sup>2(+)</sup>, Mg<sup>2(+)</sup>, Cd<sup>2(+)</sup>. Traces of Mn<sup>2(+)</sup> cause green luminescence

**>>Variant:** β-form

**Molecular Formula:** O<sub>8</sub>P<sub>2</sub>Zn<sub>3</sub>

**Molecular Weight:** 386.113

**Accurate Mass:** 381.694279

**Percentage Composition:** O 33.15%; P 16.04%; Zn 50.81%

**Source/Synthesis:** Obt. from α-form at >962°

**Melting Point:** Mp 1060°

**Other Data:** Exhibits red luminescence with traces Mn<sup>2(+)</sup>. At Mp and above loses P<sub>4</sub>O<sub>10</sub>

**>>Variant:** γ-form

**Molecular Formula:** O<sub>8</sub>P<sub>2</sub>Zn<sub>3</sub>

**Molecular Weight:** 386.113

**Accurate Mass:** 381.694279

**Percentage Composition:** O 33.15%; P 16.04%; Zn 50.81%

**Source/Synthesis:** Obt. from hopeite at 920°

**Other Data:** Stable at <900° and only in the presence of some impurity ions eg. Mn<sup>2(+)</sup>, Mg<sup>2(+)</sup>, Cd<sup>2(+)</sup>. Traces of Mn<sup>2(+)</sup> cause red luminescence